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AN AUTOMATIC DISASSEMBLING DEVICE FOR THE PRESSURE CONTAINER OF AN ATOMIC REACTOR

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operational state of the above-mentioned cutting equipment through the above-mentioned video camera.

2. The automatic disassembling device for the pressure container of an atomic reactor described in Claim 1 characterized by the above-mentioned position-setting device composed of the following parts: a carriage that can perform horizontal linear movement, a moving table that is mounted on the carriage and that can perform horizontal linear movement in a direction nearly perpendicular to the moving direction of the carriage; and a hoist which is mounted on the moving table and which is used for adjusting the height position of the above-mentioned cutting equipment.

3. The automatic disassembling device for the pressure container of an atomic reactor described in Claim 2 characterized by the above-mentioned support body that can stretch freely.

4. The automatic disassembling device for the pressure container of atomic reactor described in Claim 1 characterized by the above-mentioned contact body equipped with a damper mechanism.

Detailed explanation of the invention

This invention concerns an automatic disassembling device for the pressure container of an atomic reactor which performs the disassembling operation in a remote-controlled scheme.

An atomic power station can operate continuously without repairing its equipment over a service life of about 30 years. Hence, some atomic power stations now under operation may soon become waste reactors. Therefore, it is necessary to study the project of scrapping the atomic reactor. In particular, it

is important to find a safe and fast disassembling method for the pressure container of an atomic reactor which is seriously contaminated by radioactivity.

The present invention is proposed for solving these problems. The purpose of this invention is to provide an automatic disassembling device for the pressure container of the atomic reactor that can disassemble the pressure container of the atomic reactor in a safe and fast way with a low manufacturing cost.

In the following, the structure of this invention will be explained with reference to an application example illustrated by figures.

In the figures, (1) is the pressure container of the atomic reactor which is located within atomic reactor well (2) with its axis in a nearly perfect perpendicular direction. Above atomic reactor well (2), two straight rails (3) and (3) are laid in the horizontal direction, a carriage (4) moves on rail (3). On carriage (4), there is moving table (5), which can move along the horizontal linear direction nearly perpendicular to rail (3), as shown in the plane view. Moving table (5) consists of two (upper and lower) sections.

On floor (5A) of the upper section, driving motor (6), which drives carriage (4), moving table (5), and hoist (7) are mounted. Carriage (4), moving table (5), hoist (7) together comprise position-setting device (8).

In the figures, (9) is a linear support body, which is composed of several pipes with different diameters coupled with each other so that support body (9) can stretch freely. Support body (9) is suspended from above-mentioned position-setting device (8) downward, with its lower end within pressure container (1) of the atomic reactor. The height position of the lower end of support body (9) can be adjusted to be driven in the vertical

direction by above-mentioned hoist (7). In addition, under driving of rotation driving device (10) mounted on lower-section floor (5B) of above-mentioned moving table (5), support body (9) can be rotated in the angular range of -180°-180° with the axial line as the rotational center. Besides, on the lower portion of support body (9), cutting equipment (11) composed of a plasma arc, an arc saw, or a gas melting cutting device, etc., and video camera (12) used for monitoring the operational state of cutting equipment (11) are attached. On lower-section floor (5B) of above-mentioned moving table (5), driving device (electric power source) (13) for driving cutting equipment (11) is mounted. In addition, location detectors (not shown in the figure) are attached at appropriate positions on above-mentioned carriage (4), moving table (5), and hoist (7). A contact body equipped with hydraulic damper (14) and used for defining the location of above-mentioned cutting equipment (11) with respect to pressure container (1) is attached on the lower portion of support body (9) and is in contact with the inside surface of pressure container (1). Damper (14) can absorb the vibration of support body (9) when cutting equipment (11) is activated. Above-mentioned driving motor (6), hoist (7), and driving devices (10) and (13) are controlled via controller (15) attached on lower-section floor (5B) by remote-control device (17) installed within ground operating room (16) located by a certain distance from above-mentioned position-setting device (8). This remote-control device (17) is composed of control desk (19) containing remote-control portion (18) for remote-controlling position-setting device (8) and driving equipment (13), computer (20) that automatically controls above-mentioned cutting equipment (11), and monitor television (21) that monitors the operational state of cutting equipment (11) with the aid of above-mentioned video camera (12).

In the figure, (22) is an on-machine operating device mounted on lower-section floor (5B) of above-mentioned moving table (5). It can be used in manual operation of above-mentioned driving motor (6), hoist (7), driving devices (10) and (13), etc., on moving table (5).

The disassembly of pressure container of atomic reactor by using the above-mentioned automatic disassembly equipment is performed in the following sequence.

First of all, parameters of the cutting operation of pressure container (1) of the atomic reactor should be input beforehand into the program of the computer of remote-control device (17). These parameters include the size to be cut, the 3-dimensional position of cutting equipment (11) set by position-setting device (8), and the rotational angle of support body (9) set by driving device (10). By manipulating remote-control device (17) in ground control room (16), carriage (4) and moving table (5) are moved under speed control; the lower end of support body (9) is driven by hoist (7) in the vertical direction; at the same time, support body (9) is set to the predetermined rotational location by driving device (10). With hydraulic damper (14) in contact with the inside surface of pressure container (1), the position of cutting equipment (11) is defined. When cutting equipment (11) is moved on the inside surface of pressure container (1) in the circumferential direction and vertical direction, pressure container (1) of the atomic reactor is cut from its inner side to blocks with an appropriate size. The disassembling operation state of cutting equipment (11) can be monitored on monitor television (21) installed in ground operation room (16) via video camera (12) attached on the lower portion of support body (9). In addition, in the case with less danger of exposure to radioactive rays, manual operation can also

be performed using on-machine operation device (22) mounted on moving table (5). However, such an on-machine operation device is not necessarily needed.

As explained in the above with reference to an application example, by using the automatic disassembling device for a pressure container of an atomic reactor according to this invention, the disassembly of pressure container (1) of an atomic reactor that is seriously contaminated by radioactivity can be performed safely and quickly in an automatic remote-controlled mode. In addition, this operation needs few operators (one operator of remote-control device (17), one operator for monitoring). This automatic-disassembling device consists of support body (9) that supports cutting device (11), position-setting device (8) that sets the 3-dimensional position of cutting equipment (11) and remote-control device (17). The structure is simple and cost effective.

Brief explanation of the figures

Figure 1 is an oblique view that illustrates the schematic configuration of an application example of this invention. Figure 2 is a side view of this application example.

1...pressure container of atomic reactor; 4...carriage; 5...moving table; 7...hoist; 8...position-setting device; 9...support body; 10 and 13...driving device; 11...cutting equipment; 12...video camera; 14...hydraulic damper (contact body); 17... remote-control device; 18...remote-control operation portion; and 21...monitor television.

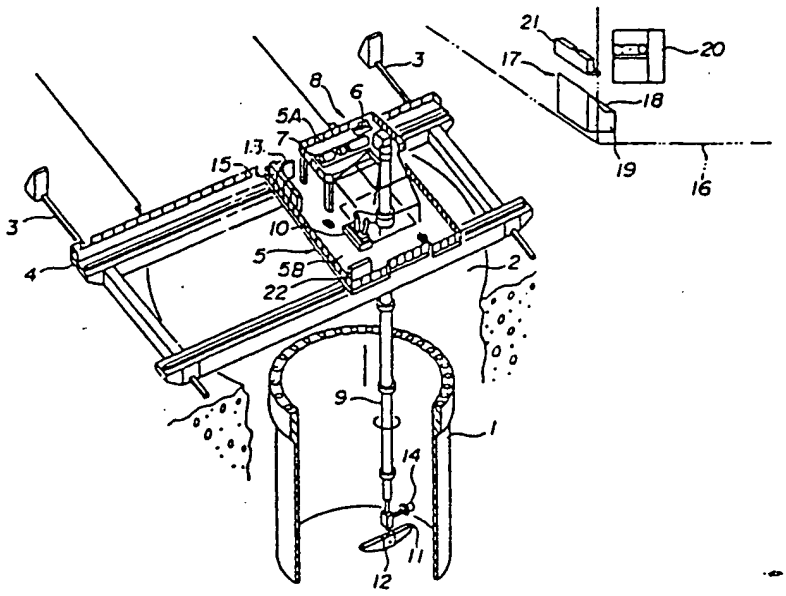


Figure 1.

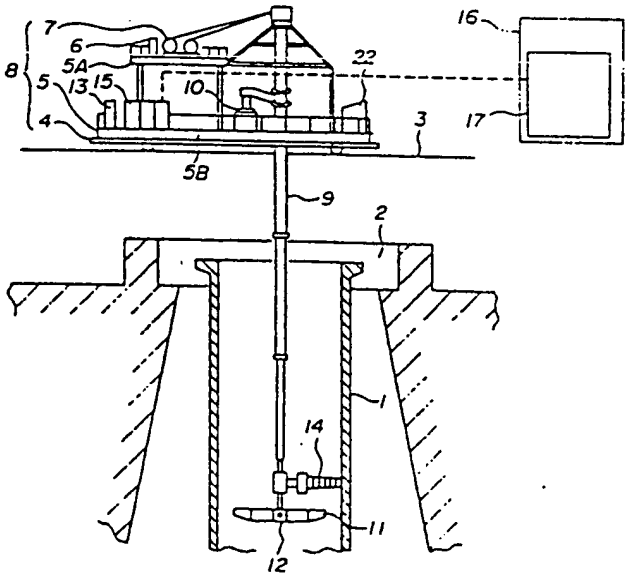
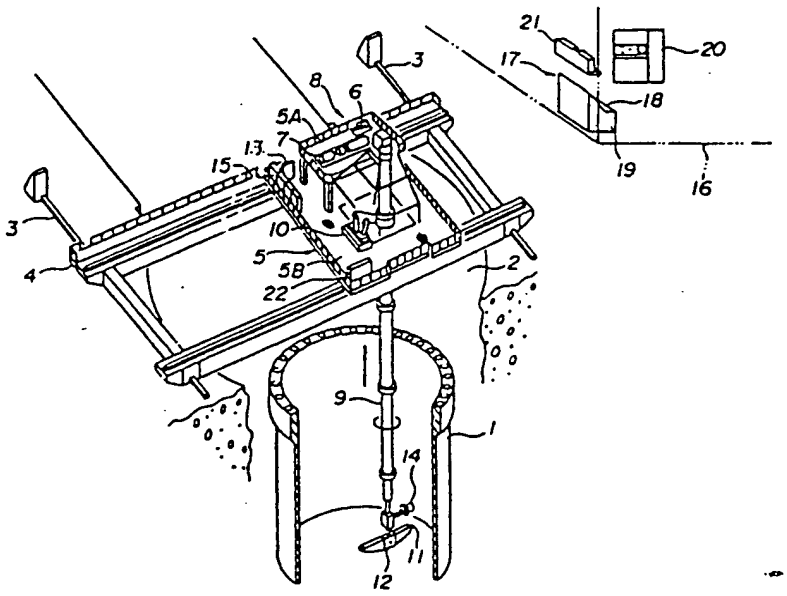


Figure 2.



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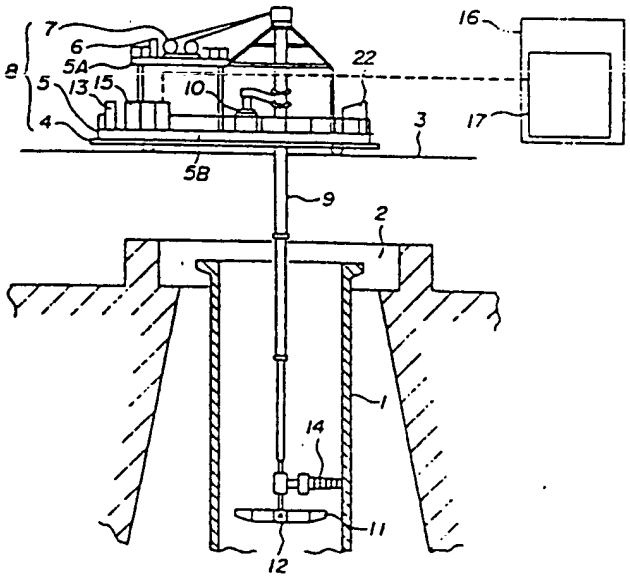

Figure 2.